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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference WO 21.1208	FOR FURTHER ACTION See Form PCT/PEA/416	
International application No. PCT/EP2004/013681	International filing date (day/month/year) 01.12.2004	Priority date (day/month/year) 31.12.2003
International Patent Classification (IPC) or national classification and IPC E21B47/10		
Applicant SERVICES PETROLIERS SCHLUMBERGE et al		
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 9 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input type="checkbox"/> sent to the applicant and to the International Bureau) a total of sheets, as follows:</p> <p><input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>		
<p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the opinion</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input checked="" type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input checked="" type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input type="checkbox"/> Box No. VIII Certain observations on the international application</p>		
Date of submission of the demand 27.07.2005	Date of completion of this report 08.02.2006	
Name and mailing address of the international preliminary examining authority:  European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized Officer Dantine, P Telephone No. +31 70 340-	



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Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:

- ☐ international search (under Rules 12.3 and 23.1(b))
- ☐ publication of the international application (under Rule 12.4)
- ☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):*

Description, Pages

1-19 as originally filed

Claims, Numbers

1-26 as originally filed

Drawings, Sheets

1/6-6/6 as originally filed

☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/figs
- ☐ the sequence listing (*specify*):
- ☐ any table(s) related to sequence listing (*specify*):

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/figs
- ☐ the sequence listing (*specify*):
- ☐ any table(s) related to sequence listing (*specify*):

* If item 4 applies, some or all of these sheets may be marked "superseded."

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Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

1. The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been examined in respect of:
- ☐ the entire international application,
 - ☒ claims Nos. 22-24
because:
 - ☐ the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (specify):
 - ☐ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. are so unclear that no meaningful opinion could be formed (*specify*):
 - ☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed.
 - ☒ no international search report has been established for the said claims Nos. 22-24
 - ☐ the nucleotide and/or amino acid sequence listing does not comply with the standard provided for in Annex C of the Administrative Instructions in that:
 - the written form ☐ has not been furnished
 - ☐ does not comply with the standard
 - the computer readable form ☐ has not been furnished
 - ☐ does not comply with the standard
 - ☐ the tables related to the nucleotide and/or amino acid sequence listing, if in computer readable form only, do not comply with the technical requirements provided for in Annex C-*bis* of the Administrative Instructions.
 - ☐ See separate sheet for further details

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Box No. IV Lack of unity of invention

1. ☒ In response to the invitation to restrict or pay additional fees, the applicant has:
- ☐ restricted the claims.
 - ☒ paid additional fees.
 - ☐ paid additional fees under protest.
 - ☐ neither restricted nor paid additional fees.
2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.
3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is
- ☐ complied with.
 - ☒ not complied with for the following reasons:
see separate sheet
4. Consequently, this report has been established in respect of the following parts of the international application:
- ☐ all parts.
 - ☒ the parts relating to claims Nos. 1-21,25,26 .

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1 - 11,14-16,25,26
	No: Claims	12,13,17-21
Inventive step (IS)	Yes: Claims	14,15
	No: Claims	1 - 13,16-21,25,26
Industrial applicability (IA)	Yes: Claims	1 - 21,25,26
	No: Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

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Re Item IV

Lack of unity of invention

The separate inventions/groups of inventions are:

1. Claims: 1-11

A flow monitoring tool system with a digital bus communication

2. Claims: 12-21,25,26

An injector tool with tracer ejection measuring means

3. Claims: 22-24

An injector tool with separate hydraulic and electrical parts

Non-Unity a priori.

The only possible common feature of claims 1, 12 and 22 is an injector tool for ejecting a tracer in a system for monitoring a flow of liquid within a borehole.

This common feature is very well known in the prior art as can be seen in document US 4.861.986. Therefore this feature cannot form the required link between the above mentioned inventions.

The problem related to subject one is to improve downhole communication inside the tool or between the tools.

The problem of subject 2 is to insure that the required quantity of tracer has been ejected.

The problem of subject 3 is to provide an injector tool which can be maintained/repared wherein the electrical elements remain protected.

As inventions 1-3 have no common special technical features, nor are these features

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linked by a common problem, these inventions do not form a single inventive concept and are deprived from unity of invention as required by rule 13(2) PCT.

Due to the lack of unity the following assessment is limited to the first two inventions for the searched claims 1-11 and claims 12-21,25,26.

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

The following documents are referred to in this communication; the numbering will be adhered to in the rest of the procedure:

- D1: US-A-4 861 986 (ARNOLD DAN M) 29 August 1989
- D2: US-A-4 355 310 (BELAIGUES ANTOINE ET AL) 19 October 1982
- D3: US-A-6 125 934 (LENN CHRISTOPHER PETER ET AL) 3 October 2000
- D4: US-A-3 692 106 (EDWARD R. BASHAM ET AL) 19 September 1972
- D5: US-A-3 156 818 (CALDWELL RICHARD L) 10 November 1964

FIRST INVENTION : CLAIMS 1-11

1) The present application does not meet the requirements of Article 33(1) PCT, because the subject-matter of claims 1 and 8 does not involve an inventive step in the sense of Article 33(3) PCT.

1.1) Document D1 discloses (cf. fig. 1 ; column 1 line 45 - 54; references in parentheses applying to this document)

a tool system (16) for monitoring a flow of liquid within a borehole (10) comprising:
a plurality of tools disposed on a longitudinal axis of the tool system (16) comprising at least a first injector tool (22) for ejecting in the borehole a tracer and a detector tool (18) to detect the ejected tracer

from which the subject-matter of claim 1 differs in that a standard digital bus traverses at least a portion of each tool of the plurality of tools and the standard digital bus allows a communication between each tool.

1.2) The problem to be solved by the present invention may therefore be regarded as improving the downhole communication between and inside the tools.

1.3) The special technical feature of claim 1 is described in document D2 (see column 4 line 17 - 52; fig. 19) as providing the same advantages as in the present application. The skilled person would therefore regard it as a normal design to include this feature in the tool system described in document D1 in order to solve the problem posed.

Although D1 discloses one tool with several tool components, it is obvious for the man skilled in the art that these tool components can be considered as separate tools and used in a modular tool. Modular tools are well-known in logging operations as can be seen in D2.

Therefore the solution proposed in claim 1 and corresponding method claim 8 of the present application cannot be considered as involving an inventive step (Article 33(3) PCT).

2) Dependent claims 2-7 and 9-11 do not appear to contain any additional features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT with respect to novelty and/or inventive step (Article 33(2) and (3) PCT), the reasons being as follows:

claims 2,9: D2 (see fig. 1) discloses a control tool (24) for data management

claims 3,10: D1 discloses a second injector tool (24) located on the opposite side of the detector tool (18).

claim 4: D3 discloses the use of several injector tools to allow injecting of different tracers.
claims 5,11: D3 discloses orientating means (see column 5 line 26-35) to adjust the ejection port.

claims 6,7: D2 (see column 44 line 45 - column 45 line 63) discloses groups of wires with standard connectors and the use of specific wires for power transmission and signal

transmission.

SECOND INVENTION : CLAIMS 12-21, 25,26

1) The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 12 and 18 is not new in the sense of Article 33(2) PCT.

The document D4 discloses (the references in parentheses applying to this document; see fig. 3,4; column 6 line 57 - 64):

An injector tool (19) for ejecting a tracer in a system for monitoring a flow of liquid (see column 3 line 3 - 14) within a borehole, the injector tool (19) comprising:
measuring means (85) to measure an ejected quantity of the ejected tracer.

The subject-matter of claim 12 and 18 is therefore not new (Article 33(2) PCT).

2) Dependent claims 13,16-21,25 and 26 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty and/or inventive step, for the following reasons:

Claim 13: D4 discloses a piston (119) with measuring means to displace the piston relative to the body of the tool.

Claim 16: D5 discloses the use of a remote control valve for an injector tool. (See column 3 line 3-5). Electro-valve is an obvious choice as in D4 the motor is an electric one.

Claims 17,19: D4 discloses a tool system comprising a detector tool (23) and an injector tool (19).

Claim 20: See claim 1 of D4.

Claim 21: Counter (27) in D4 (see column 9 line 50 - 62)

Claim 25: Combination of known elements, mere juxtaposition.

Claim 26: Combination of features. Obvious for the man skilled in the art to use different frequency for avoiding interference.

3) The combination of the features of dependent claim 14 is neither known from, nor

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rendered obvious by, the available prior art. Hall Effect switches are known (see US 4,149,411) to measure the displacement of a piston but this technique has never been used downhole in a wellbore where pressure and temperature are high. It is not considered obvious to apply this technique to the measuring of the displacement of the piston of a downhole injector.